FLORIDA STATE BOARD OF HEALTH

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THE FLY

BY

GEORGE W. SIMONS, JR.
CHIEF SANITARY ENGINEER

JACKSONVILLE, FLORIDA

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FOREWORD

The importance of the fly as an enemy to humanity cannot be too greatly stressed.

For a long time the need for a "fly booklet" has been imperative—a booklet adapted to the uses of children in schools, also of interest to adults. The lesson of the fly and its dangers should be pressed home. The State Board of Health hopes this booklet will convey a message and assist in eliminating the fly evil.

The splendid etchings used in this booklet were loaned to the State Board of Health by the Agricultural Extension Department of the International Harvester Company—an organization which is doing a great work in teaching people to live better and happier lives.

THE AUTHOR.

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THE FLY

By

GEORGE W. SIMONS, JR.,
Chief Sanitary Engineer

INTRODUCTION

One of our worst enemies is the common house or filth fly (domestica musca). The fly has often been referred to as the "typhoid fly," a very becoming and appropriate title to be sure, but one which detracts from the other dangers of the fly. The fly is as much a "tuberculosis, dysentery, diarrhoea fly" as it is a typhoid fly. This insect alone is probably responsible for more typhoid and other intestinal infections in Florida, however, than any other agent. The fly is, therefore, a deadly enemy, a silent worker that loves to prey upon the innocent and discriminate between none.

LIFE HISTORY

The female fly in a warm, moist place commences laying her eggs from *a week to ten days* after appearing. An average batch of eggs is about *120,* and a single female will lay as many as *three or four such batches.* About ninety per cent (90%) of all the house flies hatch in horse manure, in a layer a few inches below the surface. If manure is not available nor convenient, the female will lay her eggs in garbage, decaying vegetable matter, slops, rubbish, trash or human excrement. Accumulations of wet straw, collections of wet grass, old stable bedding, wet paper, decaying rags also serve as egg-laying places. Garbage soaked earth is often found alive with maggots; therefore, where the burial method for household garbage is resorted to the collections should be buried fairly deep. *Flies will breed in any fermenting organic matter, or any kind of filth or waste.*

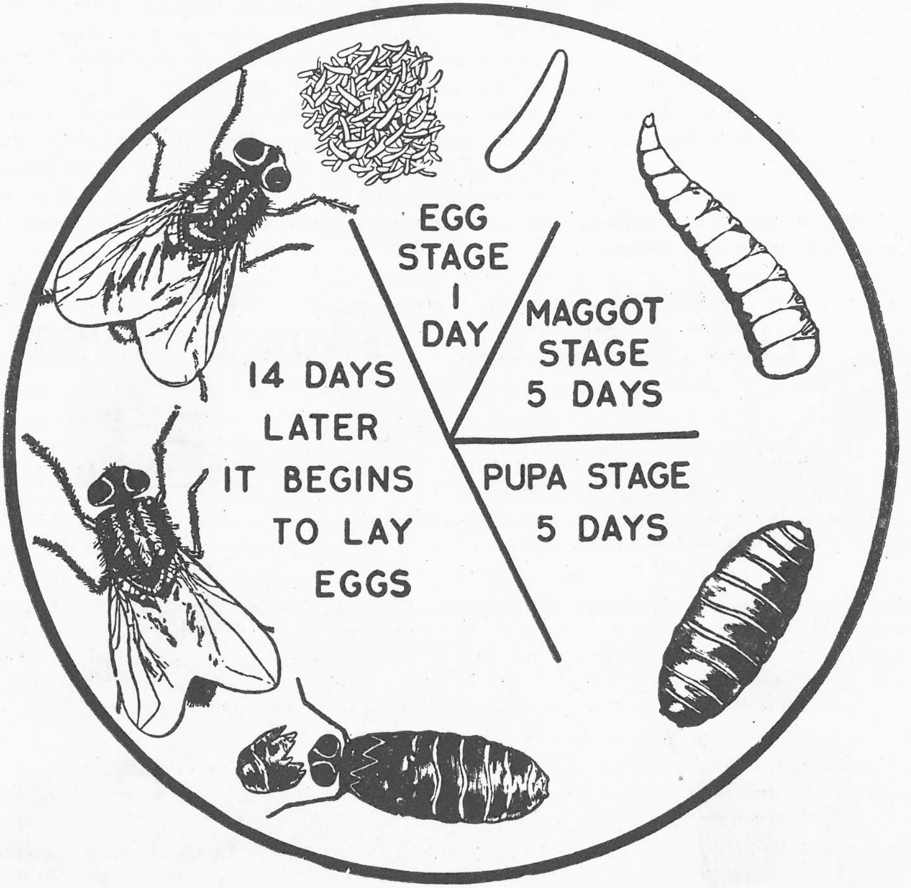
The egg of a house fly is a *small, white, oval, cigar-shaped object,* about *one-sixth of an inch* long. Generally the eggs are laid in masses on the surface of the pile. With a warm temperature the eggs hatch in from *eight to twelve hours* and the small *white wriggling maggots* crawl out to fatten and grow on the surrounding filth. In the maggot stage, with favorable temperature, *the insect grows rapidly and in five days may reach its full size* (about one-half inch long). The maggots are very active in hustling for food and move about from place to place in the filth deposits. When full growth has been reached the *maggot migrates to the bottom* or outer edge of the manure or refuse pile. During *its five days' life as a maggot* the fly sheds or *moults its skin twice,* finally throwing off its white coat and going to sleep in its *pupa case.* The maggot is then enclosed in this bean-shaped case about one-quarter inch long, which looks like a small brown egg. This stage lasts from *five to seven days,* during which time the change from maggot to full-grown fly takes place. Within the brown, barrel-shaped mummy case, or shell, the perfect fly is formed. *Once having issued from the pupa stage, adult flies do not grow.* Howard states, "Some true house flies are smaller than others because the substance in which they bred was too dry or too scanty, but all true house flies are about the same size. The very small flies which one sees are of other species."

The total period of development of the fly from egg to adult under favorable conditions of temperature and moisture is about ten to fourteen days. Cold weather, lack of moisture and scanty food supply may prolong this development period.

BREEDING TIME OF FLIES

When days are consistently and consecutively warm, flies will breed. In Florida they breed three hundred and sixty-five days a year; during the summer months the life cycle period is considerably shorter than during the few winter months. *Cold weather stops breeding, but even then the adult fly passes the cold period in crevices or cracks to emerge in warmer weather.*

LIFE CYCLE OF A FLY



9-F

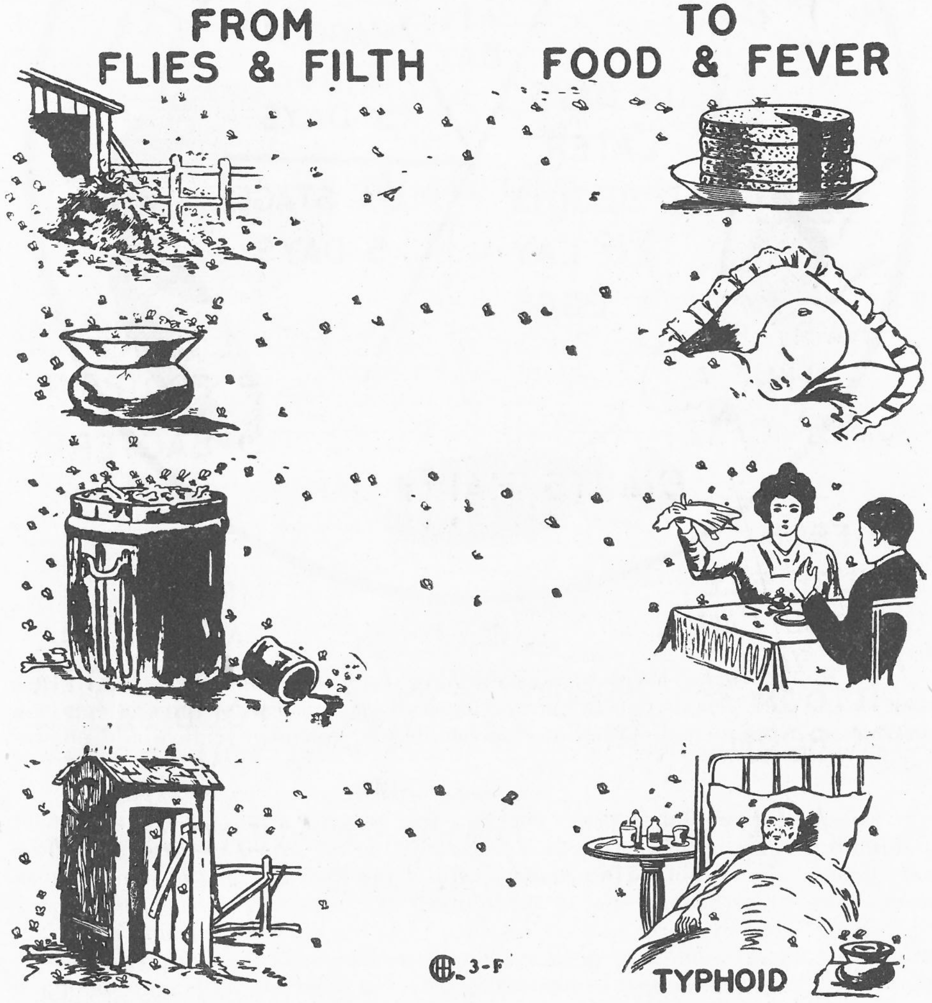
Dr. Howard states, "With nine generations, if all offspring were to survive, and even should each female fly lay but one batch of eggs instead of three or four, the descendants from a single overwintering female by September tenth would number 5,598,720,000,000."

FLY EATING-HABITS

Flies are prodigious feeders. The fly's first impulse after emerging is to feed, and in all probability the *first food is found right at the site of its birth.* The fly is not "finicky" about its food—it matters little if the food is a pile of human excrement, a pile of garbage, a spot of tuberculosis sputum or the *food on the dining-room table.* The fly learns quickly—it soon finds the kitchen or dining room, and *it is surprising the number of air-line routes a fly can make from the refuse pile to the house.* Sometimes screens embarrass the fly, but it merely waits until an opportune moment is at hand to slip inside.

A fly will suck in almost half its weight in food. "The adult fly lives upon liquid food, since its mouth parts are in the form of a sucking proboscis, but by discharging a free flow of saliva it is able to turn foods like sugar into the fluid form it can absorb." The digestive process of a fly is very simple and the food taken in passes through the body rapidly. Much that is eaten passes through the digestive tracts wholly unchanged. "As a result, after a fly has dined on tuberculosis sputum or typhoid dejecta, analyses of the resulting fly specks show the presence of the live germs of this disease."

Because of their great eating habits *a fly must necessarily deposit large quantities of excreta.* A single fly has been found to produce as many as *fifty specks in the course of twenty-four hours.* Dr. Howard states, "The specks on a window or a mirror, or a white wall, or a picture frame, left by flies are of two kinds. The smaller, rounded, darker specks are the excrement, and, depending on food, a fly may make fifty to one hundred of these specks a day. The other specks, which are larger, lighter in color and of not so regularly round outline, are caused by the regurgitation of the liquefied food from the sucking stomach. *Both these vomit spots and these excrement spots* may contain living virulent germs, and it is worthy of note that one fly will suck up the vomit spot of another fly, thus infecting itself if it were not previously infected."



THE FLY AS A DISEASE CARRIER

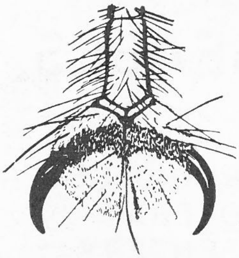
It has been shown that *the fly is an index of filth,* some of the fly's filthy habits have been portrayed. *The fly is a serious public health menace,* not only because of its eating and eliminating habits, but also because of its hairy, gauzy or bristling appendages. A fly is almost covered with hairy bristles. It is quite easy to imagine a fly feeding in the garbage pail getting its body and appendages covered with filth and *then flying to the dinner table* to alight and wipe its hairy feet on the food.

Filth contains millions of small microscopic plants known as bacteria. The hairy appendages of a fly can carry millions of these bacteria from the filth to food. Human discharges of typhoid patients contain millions of typhoid bacteria. It is very easy for a fly to carry typhoid bacteria to the food with fever as the result. Consequently the saying, "From Flies and Filth to Food and Fever."

Because of their ability to carry bacteria on their hairy bodies *flies can transmit typhoid fever, dysentery, tuberculosis, and other serious infections.* And the worst part of it, the fly-borne infections are generally peculiar to infants and small children. The fly-contaminated milk bottle, the fly-contaminated pacifier, the fly-contaminated fingers, are all familiar.

Experience indicates that many intestinal infections, incident in Florida, are the result of fly infection. *An elimination or control of the filthy fly will mean less disease.*

FLIES CARRY FILTH



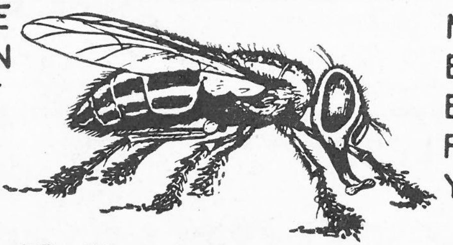
BECAUSE BRED IN FILTH

HAIRY FOOT OF A FLY

BACTERIA COLONY IN FLY'S FOOTPRINT

A FLY OFTEN CARRIES 6,600,000 BACTERIA ON ITS HAIRY BODY

FROM
MANURE PILE
GARBAGE CAN
PRIVY VAULT
SPITTOON
SICK ROOM



TO
MILK
BABY'S LIPS
BABY'S BOTTLE
FOOD
YOU

A FLY IS THE MOST DANGEROUS ANIMAL KNOWN

1-F

LENGTH OF FLIGHT

How far will a fly travel? Indications are that if an abundance of food is available near their breeding places they will not travel far. If their home comforts are poor, food is scarce or hard to get, they may travel considerable distances from their breeding places. *Flies have been known to travel half a mile in search of food.* Howard states that in one instance he knows of flies traveling at least a mile.

LIFE OF THE FLY

Ross and Jepson state that the average life of the house fly is *about three weeks.* Some authorities state, however, that they have succeeded in keeping flies in captivity for seven to sixteen weeks during summer months.

PURPOSE OF FLIES

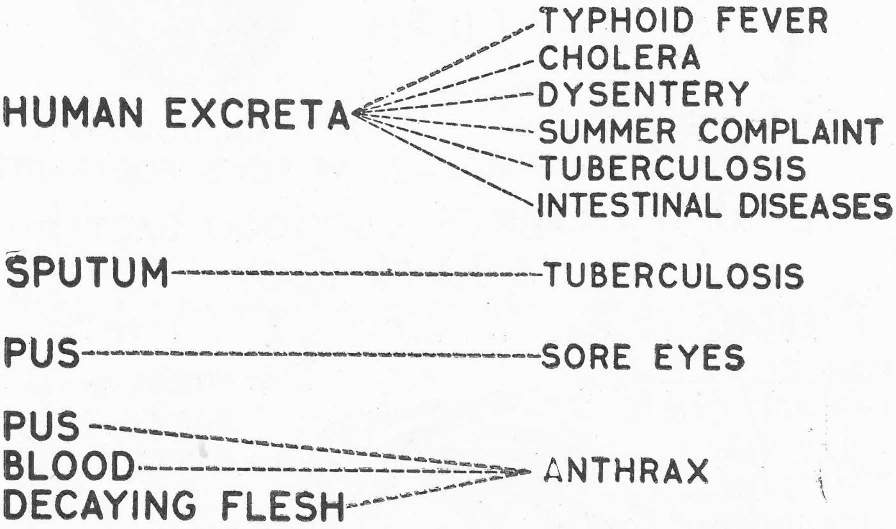
Flies have a purpose! We know that flies breed in filth and in general their habits are filthy. We also know that the greater the number of flies the more prevalent is filth in the community. Therefore, flies are an index to the sanitary condition or cleanliness of a community. The flyless town is the clean town.

PREVENTION AND CONTROL OF FLIES

Guide No. 48 of the American Museum of Natural History gives four practical methods for community protection, (1) prevention of fly breeding, (2) destruction of adult flies, (3) protection of human discharges from access of flies, (4) protection of food by screening houses and covering the food itself.

Any campaign designed to fight the fly must first call for organization and a definite plan, then by consistent effort and concerted action bring about results.

FLIES CARRY DANGEROUS DISEASES



HUMAN EXCRETA — TYPHOID FEVER, CHOLERA, DYSENTERY, SUMMER COMPLAINT, TUBERCULOSIS, INTESTINAL DISEASES

SPUTUM — TUBERCULOSIS

PUS — SORE EYES

PUS, BLOOD, DECAYING FLESH — ANTHRAX

ONE FLY SPECK FROM A FLY FED ON CONSUMPTIVE'S SPUTUM CONTAINED 5,000 GERMS OF TUBERCULOSIS

4-F

Sanitary work planned to combat the fly will also accomplish other purposes; it will effectively prevent the existence of many other conditions which are not conducive to the community's health. Measures aimed at cleaning filth and bettering the environment will have a great effect upon all good movements.

Educational propaganda is one of the essential means of enlightening the community. The newspapers, the clubs and the schools can greatly assist in forcibly driving home the significance of measures for fly destruction and control. The city governing body should promulgate and enforce all regulations and ordinances pertaining to municipal cleanliness.

MAKE YOUR COMMUNITY FLYLESS

EDUCATE AND THEN DO SOMETHING
DESTROY BREEDING PLACES
KEEP FILTH COVERED
UNTIL REMOVED
KILL ALL WINTER FLIES
MAKE ALL PRIVIES FLY-PROOF
SCREEN PORCHES, DOORS,
AND WINDOWS
TRAP THE FLY—SWAT THE FLY
OFFER PRIZES TO CHILDREN
FLY FIGHTING BEGINS AT HOME
JOIN YOUR NEIGHBORS AND ORGANIZE

KEEP EVERLASTINGLY AT IT

13-F

PREVENTION OF BREEDING

To commence any fight it is advisable to start at the source. Millions of flies can be eliminated by first attacking and removing the source of breeding. As previously shown, during warm weather is takes a fly from ten to fourteen days to hatch from egg to fly, that flies breed in all sorts of filth, especially in animal manures. The removal and disposal of this filth (the breeding places) at frequent intervals will eliminate breeding. Manure hauled and scattered on the soil at weekly periods and garbage taken and properly disposed of once or twice per week would soon create a fly shortage. If not possible to remove the manure accumulations and garbage as frequently as once a week, sanitary fly-tight receptacles should be provided. If flies cannot gain access to the wastes, no eggs can be laid therein.

"For manure or other refuse not to be used as a fertilizer powdered borax is the best chemical preventive of breeding; 0.62 pound per eight bushels of manure, or about one pound per sixteen cubic feet, will destroy 90 per cent of the larvae (maggots) present. The borax should be applied in solution, or water should be sprinkled on after scattering the dry borax over the pile."

"Borax-treated manure in large amounts may injure crops; and for manure which is to be used on the land, powdered hellebore may be recommended. A water extract is prepared by adding one-half pound of powder to every ten gallons of water, stirring and allowing to stand for twenty-four hours. The stock mixture thus prepared is sprinkled over the manure at the rate of ten gallons to every eight bushels (ten cubic feet) of manure." The above paragraphs were taken from Guide Leaflet No. 48 of the American Museum of Natural History.

DESTRUCTION OF ADULT FLIES

Adult flies can be killed in several ways, by trapping, by fly papers, by swatting. The first and last ways are quite popular. A good fly trap catches many flies.

PROTECTION OF HUMAN DISCHARGES AND OTHER WASTES

Where possible, human wastes should be carried from the point of origin by sewers, at other places septic tanks should be installed. Where neither sewerage nor septic treatment is possible, sanitary privies recommended by the State Board of Health should be provided. The State Legislature wisely passed a statute, amended in 1919, requiring sanitary privies. Plans of privies and septic tanks can be had upon request from the State Board of Health.

GET THE FLY
OR HE WILL GET YOU

YOU DON'T NEED TO HAVE FLIES IN THE HOUSE

YOU MAY THINK YOU DO
BUT YOU DON'T

YOU CAN

SCREEN THE PORCHES AND WINDOWS
TRAP THE FLY BEFORE HE GETS IN
KEEP THE BACK YARD CLEAN
DESTROY THE BREEDING PLACES

A FLY IS MORE DISGRACEFUL AND DANGEROUS THAN A BEDBUG

11-F

The open privy is a sore menace to a community. It permits the exposure of discharges to flies at all times. The only way in which a person can get typoid fever is to eat a typhoid bacteria or seed! Oftentimes the dejecta of typhoid patients go into the open privy; the little fly comes along and carries the seed to the house, and unconsciously the seed is eaten. Fly-proof privies are an absolute necessity to better health conditions.

Flies will not only breed in garbage, but will be attracted to the home in great numbers by the careless retention of these wastes at the home. Every home should be provided with a metal garbage pail tightly covered. All rubbish and filth should be gathered up and kept burned.

PROTECTION OF FOOD

Screens will protect food in the home, grocery, fruit stand and markets from the ingress of flies. The Florida Legislature in 1915 wisely passed the screen law which provides that all places exposing for sale foods to be subsequently eaten raw must screen same from flies. It is not only necessary to screen the doors and windows, but have tight-fitting screens. Sometimes fans are used by stores to keep flies from fruit, but such a measure does not conform to the law, and, further, it is not effective.

As previously stated, in executing any fly-fighting campaign the hearty support and co-operation of every person in the community is necessary. A whole-hearted, earnest attack upon the fly by every one in the community will be productive of invaluable results.

FINIS

FLIES ARE SIGNS OF FILTH

AVERAGE BACTERIA PER FLY

	BACTERIA
SWILL BARREL FLY	6,600,000
PIG PEN FLY	923,000
HOUSE FLY	880,000
COW STABLE FLY	420,000

FILTHY PLACES DANGEROUS TO HEALTH

CLEAN UP AND KEEP CLEAN

CONN. BUL. 51

2-F

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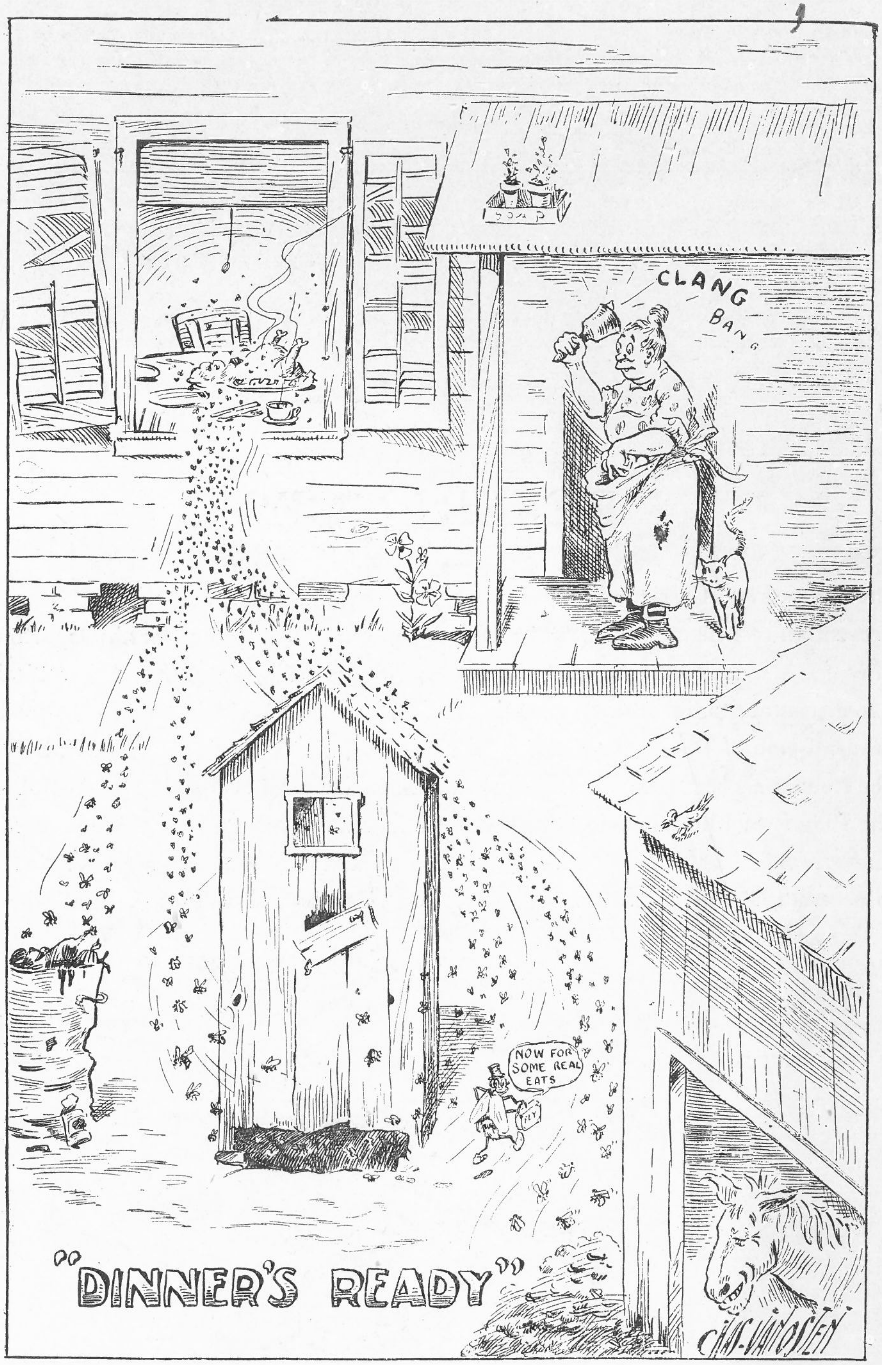
The Common Fly	Pennsylvania Health Bulletin
The Plague of Flies and Mosquitoes	W. H. Booker
Flies	Mrs. W. N. Hutt
Insects and Disease	American Museum of Natural History



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